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BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT SURVEY OF THE KOOTENAI NATIONAL FOREST 1938

by
Tom T. Terrell
Scientific Aide

ANALYSIS OF SURVEY DATA AND RECOMMENDATIONS

by
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The program of forest insect surveys now being conducted each year by the Bureau of Entomology and Plant Quarantine has as its objective the detection of potential insect outbreaks while still in their early stages. Such information is vital to the proper planning for the institution of control, in order that such operations can be conducted at a time when the cost will be lower and the work most effective. As a part of this program the pine stands of the Kootenai National Forest were covered by an extensive survey during October, to determine the existing status of the mountain pine beetle infestations.

This project was under the direct supervision of the Forest Insect Laboratory at Coeur d'Alene, Idaho, with Tom T. Terrell in charge. Work was instituted on October 12 and was completed on the 28th. A crew of five strip runners were employed on this project, who covered approximately 138 miles of sample strip line, or 1106 sample acres.

Sample strips one chain in width and of varying length were employed in obtaining data covering the seriousness of the mountain pine beetle infestation. Available timber type data as well as the best judgment of the officers in charge were used in the location of these strips in order that the sample obtained would be representative

(See letter of 11/21/38 from Evendento Craighead in file 631--Clearwater N.F.)

of the area in question. These strips are plotted by compass bearings, which are roughly followed by the strip runners, who also pace the distance covered. Data are recorded for each ten chains of strip (1 acre) covered, in order that the more seriously infested areas can be located.

Funds were allotted by the Forest Service for the execution of this survey.

STATUS OF MOUNTAIN PINE BEETLE INFESTATION AS REVEALED BY 1938 SURVEY

In the execution of this project the territory to be covered was divided into different working units. The data depicting the status of the infestation within each of these units, with a brief discussion of the condition recorded, follow:

PETE CREEK UNIT — 2880 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
49	2	435	.041	8.9

Percent of stand killed: .46

Number of infested trees: 118

Although there has been a very severe insect infestation in the Pete Creek unit, very little 1938 infestation was recorded.

SPREAD CREEK UNIT 1,250 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
19	0	289	0	15.2

Although no infestation was recorded on the sample strip in the Spread Creek area, one group of four infested trees was found and examined. It is thought that only a light infestation occurs in the area.

NORTH MEADOW CREEK UNIT 800 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
25	7	481	.280	19.2

Percent of stand killed: 1.45

Total of infested trees: 224

The sample strip examined in the Meadow Creek unit is believed to show a somewhat higher infestation than is present in the area. Practically all of the infested trees recorded were in the lower end of the unit. The attacks recorded were rather heavily infested, but nearly half of them were last summer attacks with the brood in the egg stage. It is doubtful if such trees will produce a very high brood.

SOUTH MEADOW UNIT 600 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
29	2	518	.068	17.86

Percent of stand killed: .38

Total of infested trees: 40

While no serious infestation exists in the South Meadow Creek unit, there is a blowdown area near the end of the road which is believed to be responsible for a small area of infestation of about 8 trees. This blowdown area of about 4 acres is believed to have occurred in 1933, with a few trees falling annually. Six of the eight trees found were lightly attacked. Three of the infested trees were windfalls and two were small trees.

There were a large number of cull logs left from a 1937 logging operation, but none showed evidence of infestation.

SEVENTEEN MILE UNIT 1,000 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
47	1	597	.021	12.7

Percent of stand killed: .16

Total of infested trees: 21

Although there has been considerable control work, and there is evidence of an older infestation which killed a large amount of this stand, there is practically no present infestation in the white pine.

An infestation in the spruce stands was reported, however, and it is believed to be quite severe.

STAR CREEK UNIT 2,400 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
74	53	1040	.716	14.05

Percent of stand killed: 5.09

Total of infested trees: 1718

The Star Creek area may be divided into three parts: Lower Star Creek, which contains about 1,000 acres, and Upper Star Creek and Raymond Creek, which contain about 700 acres each. Raymond Creek is believed to have the best stand of pine and also has the heaviest insect infestation. The infestation occurs in groups of trees up to 15 in number. Although the trees are heavily attacked, brood conditions are not believed to be highly potential. Of 12 trees examined for brood count only one rated rapid increase, 3 medium high, 1 normal, and 7 decrease. Of approximately 25 trees examined intensively the proportion of estimated decreasing brood was comparable. Parasitism was very noticeable, as a large number of Medetera and Coeloides were seen.

Although this infestation is not believed to be increasing, it is on a rather high plane and is killing a high percentage of the stand. The 1937 kill is approximately the same as that of 1938, and no doubt the 1939 infestation, even though a decrease occurs, will cause considerable destruction.

It is believed that the timber in this drainage is to be sold in the near future.

RUBY CREEK UNIT 3,280 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
92	6	1294	.065	14.1

Percent of stand killed: .46

Total of infested trees: 213

A very light infestation is reported from the Ruby Creek unit. This unit has a good stand of mature timber and is adjacent to Star Creek, where a severe infestation exists. However, the timber is to be sold and logged within the next few years.

NORTH CALLAHAN UNIT 1,720 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
35	4	136	.114	3.88

Percent of stand killed: 2.94

Total of infested trees: 196

Very little timber was found in this drainage. Although .114 infested tree per acre was reported, the attacks on these trees were very recent and were without brood. The only other tree found showed about 90 percent emergence. Very little sample strip was examined, as it was necessary to walk from 6 to 10 miles before starting the strips.

SOUTH CALLAHAN UNIT 2,000 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
25	0	194	0	7.8

No infestation was reported in this rather isolated strip of timber. However, as North Callahan had an infestation of .114 infested tree per acre, there is little doubt that a light infestation exists in South Callahan Creek.

NORTH KEELER CREEK UNIT 1,840 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
124	27	1120	.218	9.0

Percent of stand killed: 2.3

Total of infested trees: 600

There are four separate areas in the North Keeler Creek unit, one a small sale area of about 120 acres in which strip No. 5 was run. There are an estimated 105 infested trees in this area which are very lightly attacked and average from 8 to 10 inches in diameter. A large number of the remaining trees had been scorched and many of them were dead with no evidence of insect attack. It is doubtful if control measures would be feasible in this ar a.

Another small area of a comparable size to the sale area lies near the mouth of North Keeler Creek. In this area the timber is very young and heavily stocked. Strip No. 5a was run in this area

and on nine acres three infested trees were found. Of the three infested trees one was heavily attacked and contained a large brood. A number of small trees were found to be dying from an unknown cause. The infestation in this area is similar to that in Lower Keeler Creek, which it nearly adjoins.

A serious infestation exists in Surprise Draw and in the main part of North Keeler Creek. Sample strips run in this area showed only .15 infested tree per acre but reported several large groups off the strips. An actual count was later made of the groups which showed a total of 82 infested trees in Surprise Draw and 85 in North Keeler Creek. Because the areas were rather small and the type definitely defined, it is believed at least 80 percent of the groups were seen. Correcting the data found on the sample strips by the groups actually counted plus an estimated 20 percent would give a total of 440 infested trees. The infestation in these trees is very heavy and the trees have a long infested length. They occur in groups of up to 50 infested trees. Although large numbers of parasites were seen in the infested trees, it is felt that the infestation has a high potential increase and should be controlled.

LOWER KEELER CREEK UNIT 500 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
30	28	486	.933	16.2

Percent of stand killed: 5.76

Total of infested trees: 466

This small area lies along the lower part of Keeler Creek from the section line between 26 and 27 to the junction of Trail 477 on the Keeler Creek road. The area is approximately 3 miles in length and 20 chains wide.

The timber is young and quite small; the average diameter is about 10 inches. Large numbers of these trees are dying from some unknown reason, but it is believed to be due to drought. Although a large number of the infested trees have light broods, a few have very heavy broods. Because of the smallness of the stand and the thin bark on most of the trees, parasitism is very noticeable.

UPPER KEELER CREEK 4,300 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	New attacks	Green trees	New attacks	Green trees
106	3	1004	.028	9.4

Percent of stand killed: .29

Total of infested trees: 120

Except for the infestation listed as Lower Keeler Creek, the stands in Keeler Creek are but lightly infested. The type is largely hemlock and mature white pine with a very light stocking except in Halverson Creek.

BENNING CREEK UNIT 1,720 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
76	32	1424	.421	18.7

Percent of stand killed: 2.2

Total of infested trees: 724

A rather severe infestation seems to be spreading through the stands of the Benning Creek unit. Most of the infested trees are in the main fork of Benning Creek in sections 24 and 25. The infested trees are heavily infested and occur in scattered singles and in groups. Control measures are believed to be feasible in this stand.

SPAR LAKE UNIT 4,960 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
114	17	1233	.149	10.8

Percent of stand killed: 1.37

Total of infested trees: 635

The infestation seems to be confined to the overmature stands near the head of the lake and along the road for about one-half mile below the lake.

In the overmature stands the timber is very large and not heavily stocked and it is heavily mixed with cedar and hemlock. The broods in the infested trees are large and there will no doubt be a good emergence. However, considering the size and the scattered character of the remaining stand, it is felt that no increase will occur.

The roadside infestation below the lake is largely due to tree injury from road construction. Of several trees examined only two had a severe brood population.

Nearly all of the timber in this unit is to be sold and will probably be logged this winter. The trees are already marked and roads are being constructed for logging purposes.

WEST FORK OF QUARTZ CREEK UNIT 1,400 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
36	4	423	.111	11.75

Percent of stand killed: .949

Total of infested trees: 155

Although the sample strip data secured in the West Fork of Quartz Creek recorded .111 infested tree per acre, it is thought that the infestation is not serious. A number of dead trees examined showed no evidence of insect attack. There were also a large number of Ips-killed lodgepole seen in this area.

BRISTOW CREEK UNIT 1,120 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
17	1	360	.058	21.17

Percent of stand killed: .28

Total of infested trees: 64

The infestation in the Bristow Creek unit is light. Only three other infested trees were recorded other than the one found on the strip. There was considerable evidence that there was a far heavier infestation in the area when control measures were applied.

NORTH FORK OF BIG CREEK UNIT 640 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
9	1	195	.111	21.66

Percent of stand killed: .51

Total of infested trees: 71

The white pine type in the North Fork of Big Creek consists largely of a narrow strip of timber along the creek. Several 20-chain plots were examined at half-mile intervals along the creek and only one infested tree was recorded. Two groups of 2 and a single infested tree were seen off the strip and it is believed to be the only infested tree in the lower half of the area. The type was so narrow that both edges could be seen from the trail.

ROBERTS CREEK UNIT 1,040 Acres

No sample strip was examined in the Roberts Creek area because of the remote location of the area. The timber was viewed from an open point and a portion was examined and no infestation was recorded. The type is nearly all cedar and spruce, with only enough pine to place it in a white pine type.

MADGE CREEK UNIT 225 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
19	32	738	1.68	38.8

Percent of stand killed: 4.3

Total of infested trees: 378

CAMP CREEK UNIT 225 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
20	9	340	.45	17.0

Percent of stand killed: 2.6

Total of infested trees: 101

Of these two small drainages near the lower end of Bull Lake, Madge is the more heavily infested. They are both isolated from other areas of white pine and do not have a very good stand. The timber lies, largely, along the creek bottoms and is mixed with larch. Quite a number of white pine are dying without insect attacks on the drier southern slopes.

Spring Creek, which lies to the south, has practically no white pine.

BEAR CREEK UNIT 2,240 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
61	6	1360	.098	22.3

Percent of stand killed: .44

Total of infested trees: 220

Of the six infested trees found on 61 acres of sample strip,

three were infested windfalls. It is believed that only a light infestation exists throughout the area.

RAMSEY CREEK UNIT 2,560 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
82	3	1553	.036	18.9

Percent of stand killed: .19

Total of infested trees: 92

The Ramsey Creek unit includes the white pine stands in Libby and Poorman Creek as well as the stands in the Ramsey Creek drainage. The insect infestations throughout these areas apparently are in a normal condition. One area of about 160 acres on Libby Creek which had been logged except for the smaller trees had a light infestation in the remaining stand. Although the sale was made on private land and the logging company took all the merchantable timber, a fair stand of eight-to-ten-inch timber was left. However, through sun scalding and logging injury many trees were weakened and have been subsequently attacked by bark beetles. The attacks are light and often one sided. As very little brood was recorded in these trees, it is felt that very little reinfestation will result from this area. A small burn, evidently from roadside-cleanup work, in section one has 10 lightly infested trees.

TURNER UNIT 800 Acres

Acres of sample strip	Trees on strip: New attacks	Trees on strip: Green trees	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees
17	0	144	0	8.5

No infestation was reported from this small isolated area on Pine Creek. The stand is not heavily stocked and is inclined to small pole type timber.

SUMMARY TABULATION OF 1938 INFESTATION OF THE MOUNTAIN PINE BEETLE IN WHITE PINE

Unit	Acres	Trees per acre		Percent of stand killed	Total number infested trees
		Attacked	Green		
Pete Creek	2550	.041	8.90	.46	118
Spread Creek	1250	.0	15.20	---	---
North Meadow Creek	800	.280	19.20	1.45	224
South Meadow Creek	600	.068	17.86	.38	40
Seventeen Mile Creek	1000	.021	12.70	.16	21
Star Creek	2400	.716	14.05	5.09	1718
Ruby Creek	3280	.065	14.10	.46	213
North Callahan Creek	1720	.114	3.88	2.94	196
South Callahan Creek	2000	.0	7.8	---	---
North Keeler Creek	1840	.218	9.0	2.3	600
Lower Keeler Creek	500	.933	16.2	5.76	466
Upper Keeler Creek	4300	.028	9.4	.29	120
Benning Creek	1720	.421	18.7	2.2	724
Spar Lake	4960	.149	10.8	1.37	635
West Fork of Quartz Creek	1400	.111	11.75	.95	155
Bristow Creek	1120	.058	21.17	.28	64
North Fork of Big Creek	640	.111	21.66	.51	71
Big Creek Roberts	1040	---	---	---	---
Madge Creek	225	1.68	38.8	4.3	378
Camp Creek	225	.45	17.0	2.6	101
Bear Creek	2240	.098	22.3	.44	220
Ramsey Creek	2560	.036	18.9	.19	92
Turner	800	---	8.5	---	---
	39,530				6,156

COST ANALYSIS 1938 SURVEY

Project started October 12, and was completed October 25, 1938.

Effective man days	--- 60
*Noneffective man days	--- 70
Supervision	--- 16
Total man days	146

Miles of sample strip --- 138 Acres of sample strip --- 1106

Total acreage of territory covered --- 39,530

Expenditures:

Subsistence	$51.65
Transportation	105.93
Wages (includes cook)	590.81
Miscellaneous	4.45
	$752.84

Cost per effective man day	--- $12.54
Cost per total man day	--- $5.15
Cost per acre of strip	--- $0.68
Cost per acre of area covered	--- $0.019

*Moving 18, Annual Leave and Holidays 36, Cook 16.

ANALYSIS OF SURVEY DATA AND RECOMMENDATIONS

by
James C. Evenden
Senior Entomologist

The survey of the Kootenai National Forest indicates the existence of a mountain pine beetle infestation in white pine that varies in severity within the different units. In most of these units the infestation is at what can be considered a normal status and in its present condition is not considered serious. However, the rather constant annual loss of white pine within these areas has left a very light residual stand. An average white pine stocking of all areas included in this survey is but 13.89 stems per acre, which includes 8-inch diameters. Under such conditions even a light infestation of a fraction of a tree per acre destroys an alarming percentage of the stand. Although there was very little infestation in some units, this season's loss within the white pine areas of the Kootenai Forest amounted to 1.549 percent of the residual white pine stand. It is obvious that a few years of such losses will leave white pine stands, that have already suffered serious depletion, in an unmerchantable condition.

The mountain pine beetle infestation within the Kootenai Forest is not new, as past records of surveys and control projects during the past 10 years indicate. Furthermore, at the time these projects were instituted the countless snags of insect-killed trees that were seen in most all areas gave further evidence that the infestation

could not be considered as new at that time. Some of the control projects conducted during the past decade have been successful in practically eliminating the infestation from the areas, while others, although perhaps even more successful in preventing additional depredation of timber, have left potentially dangerous situations within the controlled area. Since 1926 there have been approximately 19,750 infested white pine trees treated at a total cost of $97,306. It is difficult to even attempt an estimate as to the benefits derived from these expenditures, although one may be sure that a large percent of the present white pine timber stand is still alive as a direct result of control. An attempt was made to prepare a tabulated history of the infestation within the different units of this forest so as to permit a clearer appreciation concerning the seriousness of the existing situation. However, as the boundaries and acreage of the different units have changed from year to year, with seasons of no data, it was found that such a tabulation would have little, if any, value.

Near Spar Lake on the head of Stanley Creek a rather severe infestation of the mountain pine beetle is present within the white pine stand on both public and privately owned lands. This area was not included within the territory covered by the survey, as the timber was being marked at that time for cutting during the present winter.

The areas for which control is considered necessary are the

North Keeler Creek, Benning Creek, Madge Creek, and Camp Creek units. The character of the infestation within these units is shown in the following tabulation:

Drainage	Acres	Infested trees per acre	Total	Percent of stand
North Keeler Creek	1,840	.215	600	2.3
Benning Creek	1,720	.42	724	2.2
Madge Creek	225	1.68	378	4.3
Camp Creek	225	.45	101	2.6

The 1938 infestation within these units has resulted in a fairly heavy loss per acre, with a rather large percentage of the residual stand being destroyed. The character of the insect broods indicates an increased loss in 1939, although this will not be exceptionally heavy. Due to the extremely late season and warm weather experienced during the fall of 1938 there was a partial emergence from many trees that lowered the rating of potential emergence computed for the 1939 season. This also resulted in a number of late attacks, the broods from which will pass the winter as eggs or small larvae. As there may be a very high mortality in these immature broods, it will be necessary to examine these trees in the spring prior to the institution of control.

Local forest officers advanced the belief that it might be possible to remove the insect-killed timber from the North Keeler Creek

unit through a salvage operation. If this is possible, it is recommended that every effort be made to secure this assistance in reducing the insect losses within this area. On the other three areas there are approximately 1,200 infested trees that should be treated early in the spring of 1939. As it is estimated that the cost of this operation will be $6.00 per tree, the sum of $7,200 will be required. If the infestation within North Keeler Creek can not be salvaged, it will be necessary to increase this allotment to $10,800.

It is recommended that the infestation within these four units be treated as early in the spring of 1939 as possible.

UNITS FOR WHICH CONTROL IS RECOMMENDED SHOWN IN RED